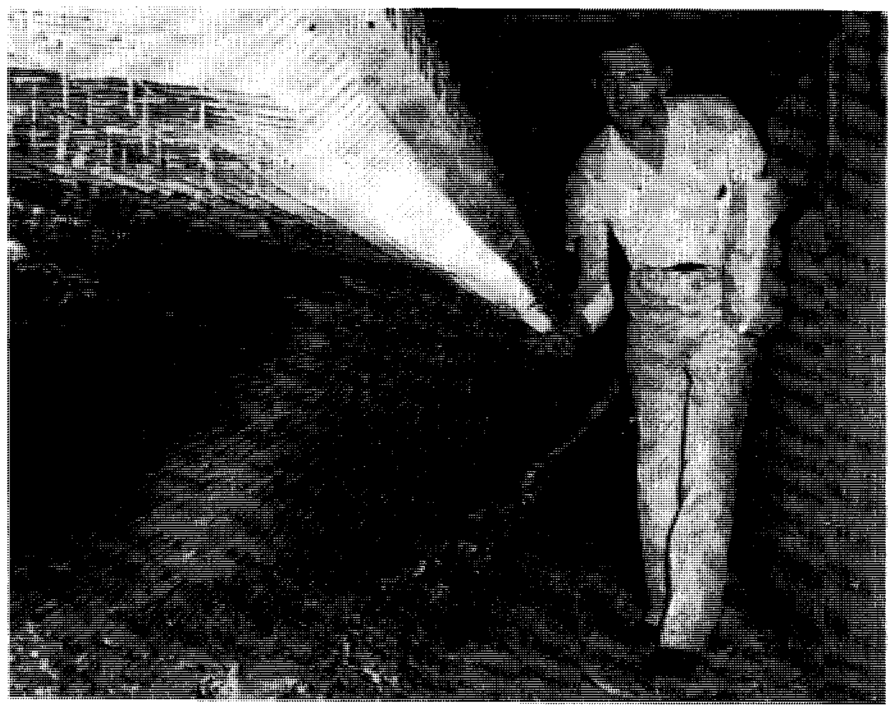
# Ag and Food Interprets . . .

- **Insect baits get new emphasis as control weapons, survey tools**
- **Insecticides coming into greater use for seed treatment**
- **More effective new miticides on the way to growers**
- **U. S. pesticides find growing competition in overseas markets**
- **Official data on 1954-55 fertilizer year show slight dip in usage**
- **Big dip in use of nitrogen on U. S. farms expected by some**
- **Is spraying against ragweed the answer to hay fever?**

## Insect Baits

**Poison baits and attractants find growing use for both survey and control measures**



Florida Agricultural Supply entomologist scatters poison fly bait beneath poultry cages. Over a million pounds of sugar and cornmeal went into fly baits in 1955

CHEMICAL and natural lures are getting closer attention today from entomologists, who need more accurate surveys of recent pest outbreaks. Tonnage-wise, however, poison baits are used most for control of house flies and a few other insects. Baits act essentially to increase the effectiveness of insecticides by drawing pests to the poison. This procedure is about the only low cost and convenient method for control in situations where spray cannot be used.

Attractants or baits (the words are usually used synonymously) combined with an insecticide are not new. Over half a century ago, bran and a sweetening agent plus arsenic compounds as toxic materials were used against grasshoppers. Other natural baits (such as malt, fat, yeast, decaying meat or other proteins, and sassafras, pine, mace, and linseed oils) have been used with variable success. Then 20 to 30 years ago, researchers began developing semi-effective and partially specific attractants—bromostyrol, terpinyl acetate, gyptol (a sex attractant specifically for the male gypsy moth), geraniol, eugenol, and the various protein hydrolyzates.

### Chemical Research

Today, research in the bait field, with the USDA's Entomology Research Branch leading the way, is directed generally at screening natural bait possibilities and at attempting to synthesize those compounds attractive to certain insects. Some of the work aims at finding attractants for fruit flies having considerable economic importance—Mediterranean, Mexican, and Oriental fruit flies, and the melon fly. Oil of anglica seed, now in limited use as a lure with malathion as the toxicant for survey purposes in the Mediterranean fruit fly outbreak in south Florida, is being investigated for the particular constituent responsible for its attractiveness to the Medfly. To date, chemical evidence indicates certain hydrocarbons are attractive to Medflies, but not to other fruit flies. A new and fairly effective lure, identity of which has not been disclosed, for the male melon fly receives further work in an attempt to find a molecular structure having greater attractiveness.

USDA workers are expanding the collecting and rearing program for female gypsy moths to produce the attractant needed for survey traps in New England where the moth is becoming a serious pest. Chemical work on the nature of the gypsy moth sex attractant resumed recently in conjunction with this program. Should chemists succeed in determining its chemical structure, it is conceivable that it might lead to synthetic attractants for other insects of the Lepidopterous or butterfly and moth order.

### House Flies

Probably the widest use of poison baits is against house and other species of flies found around barns, poultry yards, and garbage dumps. They are especially valuable in dairy barns where insecticide application as sprays is limited by the danger of contamination. Another big advantage of a scattered poison bait for use around barns and dwellings is that only a very small quantity of insecticide needs to be used. It is so widely dispersed that the chance of children or domestic animals finding and consuming enough to be hazardous is small.

Interest in baits to control house flies stems from development of the highly potent phosphate derivatives as insecticides and discovery that far greater effectiveness comes from widely scattered baits rather than use in containers placed in a few seemingly strategic locations. Since wide dispersion and use of small amounts of insecticides came into vogue, dry fly baits have almost replaced liquid baits. The bait itself usually is granular sugar alone or cornmeal mixed with sugar or molasses solutions. Some commercial formulators have developed their own bait composition either for maximum effectiveness against a particular species or for attracting as many different ones as possible. All contain a sweetening agent attractive to flies. Of insecticides used in fly baits, malathion now is most common because of its lower toxicity to mammals than most organic phosphate insecticides and generally greater effectiveness against house flies. USDA entomologists estimate over a million pounds of sugar and cornmeal went into house fly baits in 1955.

### Luring Other Insects

While poison bran baits continue to be recommended for grasshopper control on tobacco and sugar beets, air spraying with comparatively small quantities of chlordan, aldrin, or other newer insecticides has replaced baits over large areas of grass or field crops such as grains. However, in the Northwest, Mormon crickets which attack the same plants grasshoppers do, are controlled in part by poison baits. These insects breed in certain areas and migrate to raid crop and range land. Poison bran bait spread across migration paths has proved effective control in some areas. Over 245 tons of bran and rolled wheat went for Mormon cricket control in 1955.

Traps for Japanese beetles use geranol-eugenol or anethole-eugenol mixtures, with trapping limited mainly to survey measures. The lure is dispensed usually with a bottle-and-wick arrangement in the trap although bran coated with the attractant is still in some use.

Oil of angelica seed shows promise as a lure for male Medflies, but the lures in greatest use for Medflies are certain enzymatic and acid protein hydrolyzates—sometimes ammoniated with ammonium chloride. Baits for survey trapping of Mexican fruit flies include sugar solutions and the protein hydrolyzates. In several areas of the world bran baits using BHC, aldrin, or dieldrin as toxicants are used against locusts. Oil of sassafras in fermenting sugar solution finds wide use for surveys to time codling moth sprays for apples. And against slugs and snails attacking garden and truck crops, metaldehyde, a condensed polymer of acetaldehyde, has proved a very effective lure.

Admittedly small now in the overall picture of insect control even with survey uses included, baits and attractants are expected to become more important as their value becomes more widely recognized. Significant success with house fly control and surveys has brought renewed interest in finding exactly what makes a bait attractive or alluring to either a specific species or a broad class of insects. Increased efficiency of insecticides when used with baits also serves to increase interest in attractants. These factors may bring the more and better baits that entomologists have long sought.

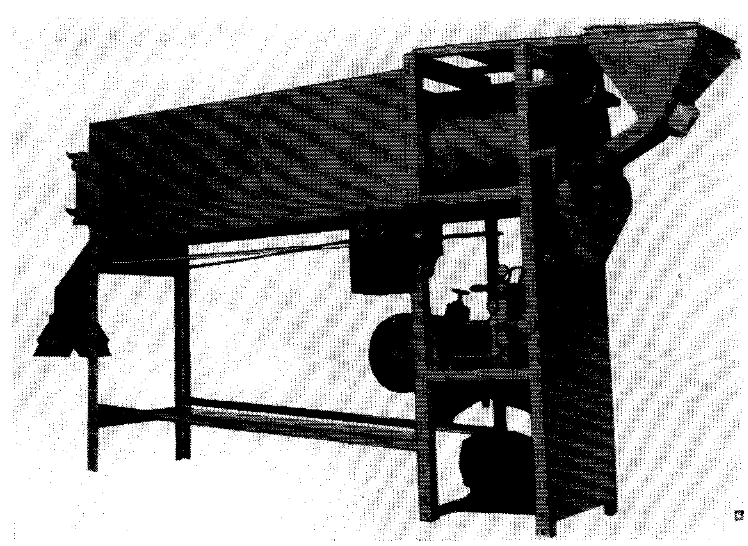
# Chemical Seed Treatment

**Fungicides opened the door for chemical treatment of seeds, but insecticides have now stepped in successfully**

WHEN A SEED IS PLANTED in the soil it is quite vulnerable to attack by microorganisms and insects. Although ideal germinating conditions will give the seed a head start, the environment is seldom exactly ideal, and damage results which impairs germination and plant vigor, leading to poor stands. Disinfectants to destroy seed-borne disease have been used for many years to prevent disease transmission from the parent plant, and such disinfectants as organic mercury compounds were found to be effective against soil microorganisms. Nonmercurials have been developed more recently.

First large-scale use of seed treatment was on cereals for control of seed-borne smuts. Aside from this, most chemical seed treatments are for protection against soil-borne, rather than seed-borne, organisms. Seed treatment chemicals have "traditionally" been fungicides. More recently, insecticides—either alone, or mixed with fungicides—have come into use. BHC, lindane, dieldrin, aldrin, heptachlor, and other insecticides have been applied to corn, beans, wheat, and certain other seeds for some time.

Fungicide seed treatment is standard procedure for hybrid corn, small grains and most other field crops. Na-



O. W. Kromer Co.'s seed treater, developed for applying American Cyanamid's Thimet 44D to cotton seed for systemic protection against insects and bacteria. Equipment handles up to 18 tons of seed per hour tional Cotton Council of America estimates 80% of cotton seed is treated. Sugar beets, other vegetables, and peanuts are some other important markets for seed fungicides.

In regard to future market expansion, grasses, small-seeded legumes, and soybeans represent the classes of crops offering the greatest opportunity for improving stands and yields with seed treatment, in the opinion of Du Pont people. Rice seed poses a special problem, since soaked seed is planted in standing water. In California, for example, up to 200 pounds of seed per acre is used, whereas theoretically 30 pounds should give a 100% stand, according to Milton D. Miller, California extension agronomist. If a really successful seed treatment could be worked out, there would be a market for supplying about 300,000 acres.

Increased irrigation in some areas, such as West Texas, is causing soil organisms to build up, making more seed protection necessary, according to Donald Ashdown of Texas Technological College. He says only a small percentage of either wheat or sorghum seed is being adequately treated, although tests show both would benefit by it.

### *Seed Treatment with Insecticides*

Insecticide-fungicide mixtures are usually preferred to treatment with insecticides alone, which seem to increase pre-emergence seed decay. Corn and small grains probably offer the largest potential use of seed insecticides although almost all crops are now treated to some extent. Insecticide seed treatment is expected to grow, but many workers prefer other means of applying soil insecticides, such as fertilizer-pesticide mixtures or other direct soil application, because the treated seed only affects a very small proportion of the total soil. The residual effectiveness is not relatively long. The fact that the seedling plant is often not adequately protected by seed treatment has led to row treatment with fungicides and insecticides for protection in the two inches or so of soil above the seed. Results to date have been most encouraging with cotton.

Perhaps the most striking recent development in insecticide seed treatment has been American Cyanamid's Thimet, a systemic insecticide which can be used to treat seed and protect not only the seed, but the plant iself. Applied to cotton seed, Thimet is absorbed into the developing plant and continues to kill certain insects for periods up to seven weeks after the plant has come through the ground. Cyanamid predicts its compound will replace the first two to four sprayings or dustings for a cotton crop.

Usually, all forms of seed treatment can be done by either the farmer or at the seed processor's plant. Thimet is an exception, and must be applied in specially constructed equipment at the seed processor's plant. Treatment is more generally used with some crops than others. Most seed corn is treated with fungicides by the hybrid corn processors. A high percentage of the commercially processed garden seed (vegetables) is treated, but it is difficult to estimate how much garden or other seed held over each year at the farm is treated. Alfalfa and other legumes benefit from chemical treatment as well as from treatment with innoculant of nitrogen-fixing bacteria.

### *Diversity of Formulations Is a Big Problem*

Critical dosages of various chemicals vary widely with different kinds of seed, so no one standard formulation or rate of application can be established for all types of seed. This is one reason for the long list of formulations needed—a problem for user and manufacturer alike. Various methods of treating seed also add to the number of different formulations.

Safety of handling is a big problem too. An extension entomologist says: "I feel that one of the biggest limiting factors in getting wider use of chemically treated seed is the lack of adequate treating facilities at the country point. Although we have conducted an educational program for some years, urging the use of treated seed, we find considerable resistance on the part of farmers to treating seeds themselves because so many of the chemicals are obnoxious to handle." As a matter of fact, even some of the firms equipped to do commercial treating find many of the chemicals difficult to use because of the safety hazard to their employees. Treated seed not used for planting cannot be used for feed purposes. It's disposition poses a question.

Seed can already be protected against most pests, so protection of the seedling plants is now the object of much research. Many feel the ideal to shoot at is systemic fungicides, as well as insecticides. More could also be known about compatability of fungicides, insecticides, fertilizers, and herbicides. (Seed treatment with herbicides holds little promise because placement is not right.)

As with all agricultural chemicals, education of the farmer is a factor. A continuing campaign must be carried out to convince him of the value received from paying somewhat more for high quality treated seed.

# Miticide Outlook

## Growers will get an assist from new miticides, but time-tested agents are holding their own

Many producers of fruits, flowers, vegetables, and cotton who are faced with mite infestations may soon have more effective miticides to help them. At least, they will certainly have a larger number of agents to choose from.

Mites are especially troublesome on citrus fruits, apples, peaches, plums, beans, cucurbits, alfalfa and related forage crops, and on ornamental flowers and shrubs. The problem of mite control became serious after the advent of DDT. Sprays or dusts of DDT destroy insects which partially control mites by feeding on them. By itself, DDT is not effective as a miticide. Mite control agents of long standing include sulfur, lime-sulfur, water, and oil-water emulsions. Aramite, malathion, and chlorobenzilate are doing a good mite-control job on ornamentals, both in the greenhouse and out-of-doors. In fact, the major share of mite control expense is for chemical agents, mostly chlorinated hydrocarbons. Largest selling of these are Aramite [2-(*p*-*tert*-butylphenoxy)-isopropyl 2-chloroethyl sulfite] and Ovotran (*p*-chlorophenyl *p*-chlorobenzenesulfonate). Chlorinated hydrocarbons are, and will probably continue to be, more important in mite control than any other class of compounds, including organophosphorus agents. One of the problems with the latter is that mites have been developing resistance to them.

### *Losses as High As $108 an Acre*

New miticides currently in field testing are also primarily chlorinated hydrocarbons. With these, there is hope of effectively cutting further losses due to mites, which often run as high as $108 per acre in heavily producing orchards. In Wisconsin, losses in apple growing are due almost exclusively to the red mite, running from $25,000 to $30,000 per

### New Miticides on the Way

| Company | Name | Chemical name | Significant field trial results |
|---|---|---|---|
| Hercules | AC 528 | Not revealed; reportedly an organophosphate | Shows considerable promise in studies being made on 2-spotted mite. |
| ICI | R-6199 (Tentatively named Amiton) | Hydrogen oxalate of *O*,*O'*-diethyl-S-$\beta$-diethylaminoethyl phosphorothiolate | Excellent against spider mites. |
| Rohm & Haas | Kelthane | 1-1-bis (chlorophenyl)-2, 2, 2-trichloroethanol | Effective against resistant mites, does not kill many mite predators. |
| Stauffer | R-1303 | *O*,*O*-diethyl-S-*p*-chloro phenylthiomethyl phosphorodithioate | Long residual action. Acts on wide range of mite and insect species. Good on ornamentals. |
| Calspray | Mitox | *p*-chlorobenzyl-*p*-chlorophenyl sulfide | Primary use on fruits, also on ornamentals. Wide use in Europe. |

year. Total damage produced by mites has never been actually determined, but mite control can cost a farmer $10 to $15 per acre.

Of the newer miticides, furthest along are materials produced by Rohm & Haas, Hercules, Imperial Chemical Industries, Stauffer, and Calspray. Close to commercial use is Rohm & Haas' Kelthane. Kelthane has proved to be effective against a wide variety of mites, including some resistant ones. According to company tests, no mite resistance to Kelthane has been evidenced over several generations. Its effect on mite predators has not yet been clearly evaluated. Many mite predators are other species of mites, and whether or not Kelthane would be selective enough not to harm these is open to question. However, opinion is that it will not kill the insect predators of mites.

Mitox was originally sold in this country by Upjohn under a working arrangement with Boots Pure Drug Co. of England. Since then, Upjohn has assigned its rights to Mitox to Calspray. Mitox is widely used in the United Kingdom, Holland, Switzerland, Italy, Denmark, Australia, New Zealand, Canada, and South Africa. Material now being marketed in eastern Canada is imported from England. Mitox has good control over European red mites with prebloom application on apples and pears. A quantity of the material is now in the hands of experiment station workers. Sales this year will be in the range of 5000 to 10,000 pounds.

Stauffer's compound is being offered not only as a miticide, but as a general insecticide. Sale of the material for food and feed crops is contingent upon establishment of suitable tolerances. These are expected to be applied for on a number of crops in the very near future.

ICI has made its product, tentatively named Amiton, only on a semicommercial scale to date. Thus far, it has given good results against spider mites at a fraction of the dosage necessary with the other materials, according to ICI. Biologically, the material works as a cholinesterase inhibitor. But at spraying strength, it involves no more hazard than several other phosphorus insecticides. Development work in the United States is being done by Chipman Chemical.

Hercules' miticide has had a number of experimental trials on citrus crops. It does not appear to have the necessary residual action to provide long commercial control, says one entomologist. However, midwestern results with the material are good.

USDA and other agencies, particularly in California, are currently evaluating systemic type organic phosphorus chemicals. These are absorbed by the roots or foliage of the plant into its sap stream. The mites, which feed on plant juices, are killed when they pierce the stems or leaves.

#### Biological Control

Studies in biological control of mites are proceeding in some areas and not at all in others. For example, in the Northwest, no work is being done. But in California, recently introduced species of mite predators are being reared at Riverside. These are being released on various crop plants throughout southern California. Field and laboratory rearing programs are being developed for the mass production of mite predators to be used in experimental periodic field releases. In the Midwest, although some biological studies are being undertaken, the effort is weak when compared to the dependence being put on chemical control and to the money spent in research in that direction.

Biological control of citrus mites is being studied rather extensively in Florida. To date, this type of control is recognized—but it is not sufficiently understood nor naturally reliable enough to enable commercial growers to abandon chemical controls.

# Pesticide Exports

## Despite '55 rise, traditional overseas markets for U. S. pesticides are being invaded by Europeans

Most people realize that exports are one of the important keys to a successful American pesticide manufacturing climate. The significant rise in pesticide exports gives the impression that the picture is all rosy. A careful study of the Commerce Department's special "World Survey of Pest Control Products" shows some reappraisal is necessary.

Preliminary 1955 figures show total U. S. pesticide exports of $79 million, a rise of 26% over last year's value. But this picture is not so pleasant when it is realized that only 23 of the world's countries had more than $750,000 in U. S. pesticide imports, and but five of these were over the $4 million mark.

West Germany, the United Kingdom, and other foreign suppliers are providing increased competition for American manufacturers. One advantage they seem to have in most countries is the effective combination of lower prices and more lenient credit terms. West Germany has found the offering of 180 days credit to be an excellent stimulus to increased trade.

United States position is strongest in the Americas, due both to proximity and historical position. About $34.5

million worth of pesticides were shipped to North American neighbors, exclusive of the Caribbean Islands. Combined totals for the Americas comes to $52.8 million.

Which countries are the big importers? For the first time Mexico passed Canada as the leading importer from the U. S. (in pesticide dollar value). Mexico's $11.1 million amounts to 14% of total U. S. pesticide exports, and graphically illustrates Mexico's increasing awareness of the need to combat pests of all kinds. Currently 33 firms are engaged in formulating and distributing pest control products in Mexico. Domestic availability of raw materials in sufficient quantity to meet requirements for manufacture of pesticides is limited to sulfur, calcium arsenate, lead, and kerosine—all other ingredients must be imported, principally from the United States.

With Mexico's plans to increase food supplies it is reasonable to expect pesticide consumption to double within 6 to 8 years. The Mexican government has started treating stored grain to prevent losses; this step coupled with an expanded public health program will call for sizable quantities of insecticides.

The U. S. supplies the major portion of Mexico's pesticide imports; but French and Belgian producers of BHC have been quoting prices under those offered by American firms, and at the same time extending credit up to 30 months. This is formidable competition, but United States insecticides have a fine reputation and are generally preferred when prices are not out of line. European competition is confined principally to BHC and lindane, and it will probably get the lion's share of the market in these items unless U. S. firms can meet prices and credit terms.

### *Canada Second*

Canada is the second largest consumer and its $8.5 million amounted to almost 11% of U. S. pesticide exports. Total annual Canadian demand for pest-control products of all types is expected to be $40 million by 1960. Some 90% of Canadian pesticide imports come from the U. S., with the United Kingdom and West Germany supplying the remainder. These imports cover all 14 categories. Most United States products are competitive in price with those of Canadian and overseas manufacture. Lindane and *p*-dichlorobenzene are quoted at slightly lower prices by European producers, but U. S. products are generally preferred for quality, flexibility of supply, lower freight, and standardization in formulation method.

Brazil is the third largest user of U. S. pesticide exports, receiving $5.2 million in imports. Germany, France, and the United Kingdom supply large quantities of BHC, copper sulfate, and other products, but Brazilian farmers appear to prefer U. S. products, so despite higher prices for some commodities, the United States will probably continue to be the principal supplier.

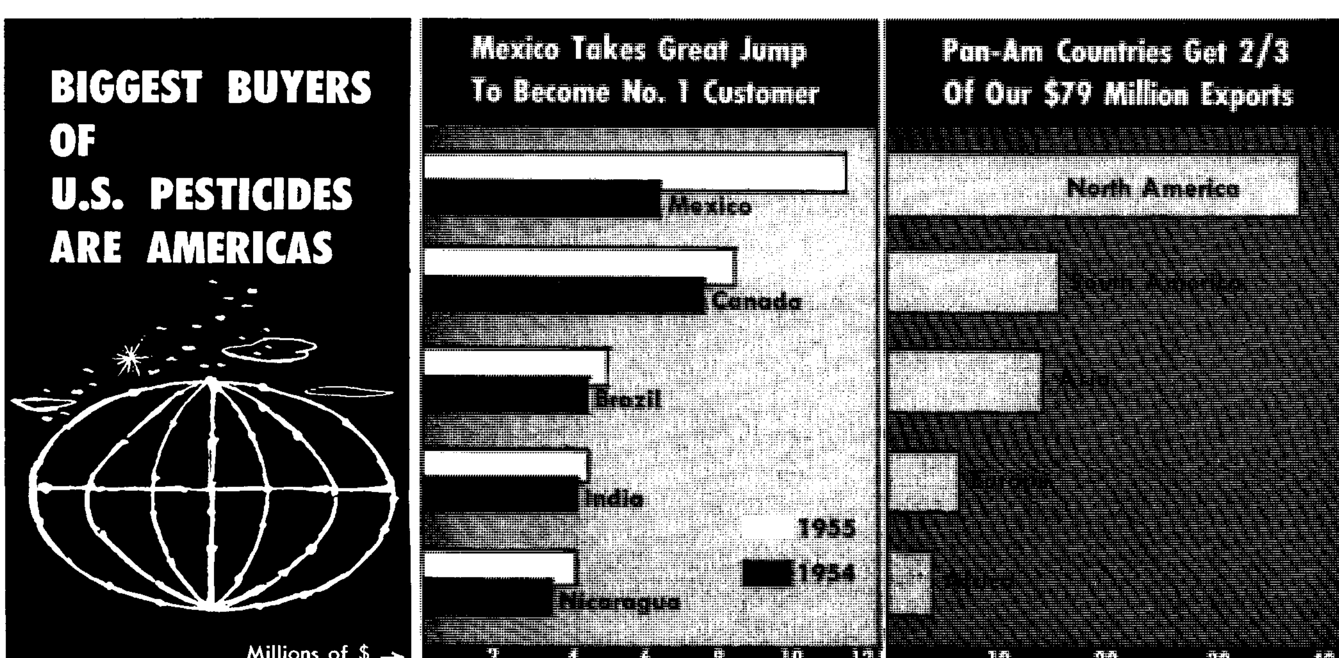
Next on the world scale is India, importing $4.5 million from the U. S. No breakdown is available on total Indian consumption or other imports.

Nicaragua follows Brazil—with U. S. pesticide imports of $4.1 million. While we supply 90 to 95% of Nicaraguan imports, Europeans are striving to capture a portion of the market by offering lower prices and long-term credit. As consumption of pesticides has doubled about every other year in Nicaragua, well-informed sources expect the use of pesticide to quadruple by 1960.

Careful study of the Nicaraguan situation shows that American companies are starting to meet European competition head-on, but must do more if they are to keep supplying 90% of increased imports. U. S. suppliers are meeting the lower prices of overseas sources, but as yet do not meet credit terms. Local distributors of U. S. products complain that few American firms print advertising in Spanish—English being of little use. This disregard of good publicity techniques could cause U. S. pesticide exporters difficulty in many non-English areas unless corrected.

Only three of the 23 countries which buy $750,000 worth of U. S. pest control products or more each year show a decrease in the value of 1955 pesticide imports from the U. S. over the preceding year: Venezuela, $3 million (down 10%); Guatemala, $1.8 million (down 11%); and Turkey $1.0 million (down 24%). No single reason explains this decline.

The close examination of the report leads to the following conclusions:



- World pesticide consumption will increase at a rapid rate in the future.
- U. S. exporters may expect increased competition from both aggressive foreign manufacturers (such as Germany, United Kingdom, Japan, Belgium, and France) and from production within the consuming country.
- American credit practices need study in the face of competition from long-term foreign credit.
- Careful promotion techniques are necessary for the U. S. to continue in this dominant position.

Copies of the complete report may be obtained for 60 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

# Fertilizer Consumption

## USDA's official figures for 1954–55 show higher nutrient use, against small decrease in total tonnage. Nitrogen solutions jump

THE ANNUAL Scholl-Wallace-Fox report on fertilizer consumption, released late last month by USDA, confirms earlier expectations that 1954–55 tonnage consumption dropped (by 0.22%) while primary nutrient use rose (by 3.8%).

Total use was 22,723,705 tons in the U. S. and its territories, a decrease of 49,794, from use in 1953–54. On the other hand, total use, on a primary nutrient basis, set a new record for the 16th consecutive year, amounting to 6,119,841 tons or 224,283 tons over 1953–54. Nitrogen use went up over 6% to a high of 1,960,536 tons; available phosphate up 2% to 2,284,362 tons; and potassium oxide, up 3% to 1,874,943 tons.

For the first time this year, separate tonnages by each state of anhydrous ammonia, ammonium nitrate–limestone mixture, nitrogen solutions (including aqua ammonia), and urea were reported. The proportion of directly applied nitrogen materials supplied by anhydrous ammonia and nitrogen solutions is shown in the chart.

Total consumption of fertilizer, on a plant nutrient basis, went up in every region of the country, except the East South Central region where consumption was the same as the year before. On a tonnage basis, usage dropped in the South Atlantic (by 1%), East North Central (by 6%), West North Central (by 2%), East South Central (by 3%), and West South Central (by 2%). Greatest increase in tonnage applied occurred in the Pacific (12% increase) and the Mountain (11%) states.

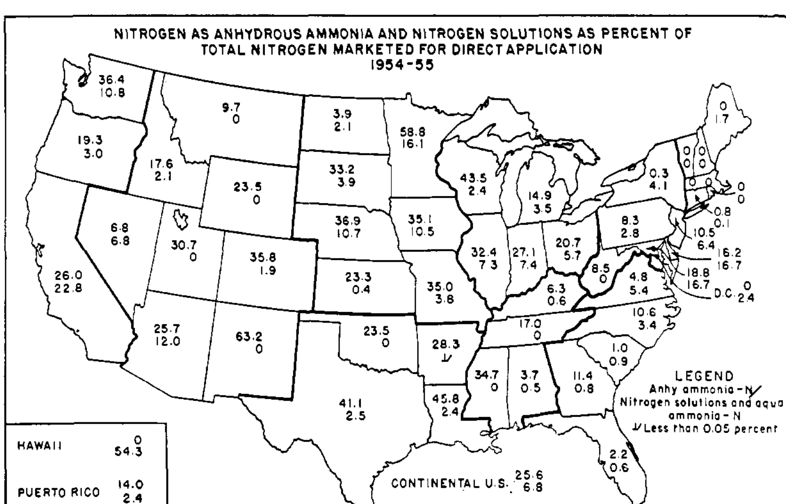
Tonnage use of mixed fertilizers decreased from 15.5 million tons in 1953–54 to 15.3 million last year. About 67% of the total tonnage of fertilizer sold was in the form of mixtures. About 15 grades account for about 60% of the total tonnage of mixtures, although there are about 1750 grades available to farmers. Among the individual states, the total number of grades ranged from 21 in New Mexico to 849 in Florida. The national weighted average of total primary nutrients contained in mixtures increased from 26.87% in 1953–54 to 27.9% in 1954–55.

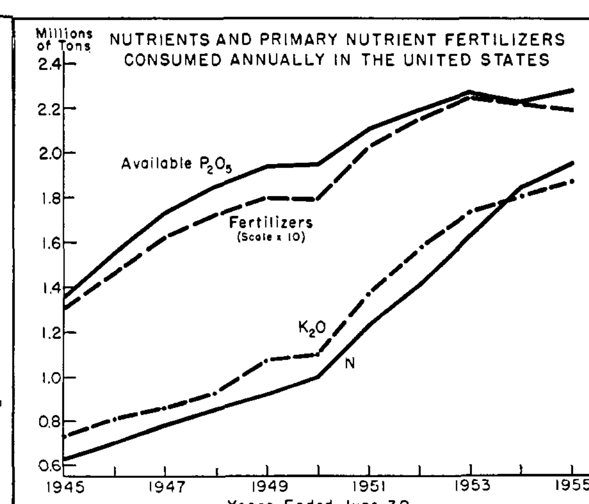
Consumption of fertilizer materials for direct application rose from 7.2 million tons in 1953–54 to about 7.4 million tons in 1954–55. Biggest share of this increase came from nitrogen materials—up 239,764 tons. Among the chemical nitrogen materials, ammonium nitrate consumption rose from 924,736 tons to over 1.1 million tons. Also increasing significantly was use of nitrogen solution—from 191,592 to 340,574 tons—attributed primarily to the growing use of aqua ammonia on the West Coast and in the territories. Use of anhydrous ammonia, in contrast, went up by only 3207 tons to 353,681 tons. A comparison of the reports of distributors and applicators for both years showed an average decrease of about 4% for anhydrous, but sales by new distributors and applicators brought up the total.

Although the tonnages of many of the phosphate materials consumed in 1954–55 was higher than that of the preceding year, total tonnage of all of these products was below that in 1953–54 because of the relatively large decrease in the use of phosphate rock—down from 912,676 to 604,653 tons. Combined tonnage of superphosphates slipped slightly to 1,027,662 tons, but the available $P_2O_5$ content of these products was 22,830 tons higher because of higher analyses.

Fertilizer materials for direct application accounted for 59.0, 20.28, and 11.58% of the nitrogen, available $P_2O_5$, and $K_2O$ consumed in 1954–55.

Compared with tonnages for each six-month period of 1953–54, most of the increase in total consumption for all fertilizer in 1954–55 occurred in the July–December period. Consumption in this period in 1954–55 was 2.47% above that in the preceding year, while that for the January–June period slipped 1.7% below that in the same period of 1953–54. This could possibly be interpreted as showing some success in the drive to encourage early buying and fall application.



# State of Flux in Nitrogen

## U. S. consumption in 1956 to drop rather than increase is prediction

At the end of 1955, Aikman, Ltd., predicted that consumption of nitrogen in U. S. would increase 6% during the following year. In its half-yearly report of May, the organization, whose estimates are generally accepted as reliable, says that U. S. consumption by agriculture will show instead a reduction of 12.5% compared with 1955. Revised downward estimate is a result of the current farming situation in U. S., large surpluses, and falling prices.

Aikman says biggest reduction will be in sale of ammonium sulfate, where cut-back will amount to 20% (explanation: increased use of liquid ammonia as mixed fertilizer and reduction of ammonium sulfate as a direct fertilizer). Use of urea and ammonium nitrate is in upward direction as savings are realized in freight rates per unit of nitrogen, it notes.

Outlook for industrial consumption in U. S. is still bright and an increase of 8% over last year is still predicted. However, this will still leave an overall reduction of 6.5%.

Sources that keep tabs on nitrogen here in the U. S. feel Aikman's figures are out of line. Their prediction is that nitrogen consumption this year will be very close to that in 1955—any increase or decrease, they believe, will be slight. They also take issue with Aikman's size-up of the ammonium sulfate situation. Any decrease in its use will be mostly due to reduction of use in mixed fertilizers, with nitrogen solutions, not liquid ammonia, taking the place of ammonium sulfate in mixtures. Unless prices of other nitrogen materials follow suit, the recent big drop in ammonium sulfate's price may result in increased sales during the last six months of this year.

Aikman's predictions for consumption in some other countries are also revised downwardly: in Europe and Egypt increase is now expected to be only 2.5% rather than 4.25% predicted in December. This drop is a result of the severe frost in February, resulting damage and re-plowing.

While consumption in U. S. is off, Aikman points out that new producers still are entering the picture every day. By end of 1956, total capacity is predicted to be 3.4 million metric tons and a year later, 3.8 million. Current stocks in U. S. are estimated at 800,000 metric tons which, when converted to terms of normal condition, means a surplus of 300,000 metric tons over normal stock requirements at present production rate.

What will U. S. producers do with this surplus? Make big shipments to Europe? Aikman thinks "no"—as result of recent freight increases, selling price would have to be $10 to $15 less than European f.o.b. prices to compete in European import markets.

### *Far East Market?*

Far East demand could absorb some of the American surplus—should U. S. policy toward China be revised. China has exports of sufficient value to meet any demand for nitrogen products. (Aikman says demand in China will hit 400,000 metric tons of nitrogen in next few years; local plants will probably be constructed to supply some of this demand.)

An export price of as low as $38.50 per metric ton has been accepted in U. S. for by-product ammonium sulfate and $40 for synthetic. However, Aikman says "there is still considerable pressure to sell." New by-product ammonium sulfate price for home consumption ranges from $42 to $32 per short ton (or $35.25 per metric ton). The lower price may reduce heavy U. S. stocks. European export price is approximately $47, bulk, f.o.b.

Additional new plants being considered during last six months (and reflecting increase from Aikman's last report) include capacities of 200,000 tons in Europe, 100,000 in Egypt and Near East, 250,000 tons in India and Far East, and 100,000 tons in South America and South Africa.

### *Russian Nitrogen*

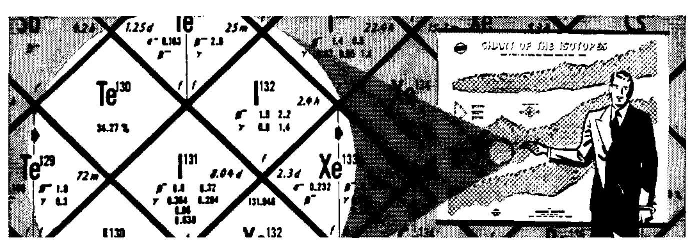
Production of nitrogen in U.S.S.R. for period ending June 1955, appears to have reached 670,000 metric tons for agriculture and 130,000 metric tons for industry. Approximately 700,000 metric tons was synthetic and 100 coke ovens. Present five-year plan in Russia calls for:

| | | | |
|---|---|---|---|
| 900,000 | tons | for | 1955–56 |
| 1,000,000 | " | " | 1956–57 |
| 1,200,000 | " | " | 1957–58 |
| 1,400,000 | " | " | 1958–59 |
| 1,600,000 | " | " | 1959–60 |

Will these increases be achieved? Aikman says that even if capacity is reached, production probably will not be achieved as result of too few engineers to operate plants.

USEFUL INFORMATION ABOUT

ISOTOPES



contained in Harshaw Scientific's

COLOR CODED (wall) CHART of the ISOTOPES*

You can tell at a glance based on the color code used, the type of nuclide, i.e., stable, naturally radioactive or artificially radioactive and the half live value ranges of the artificially radioactive nuclide.

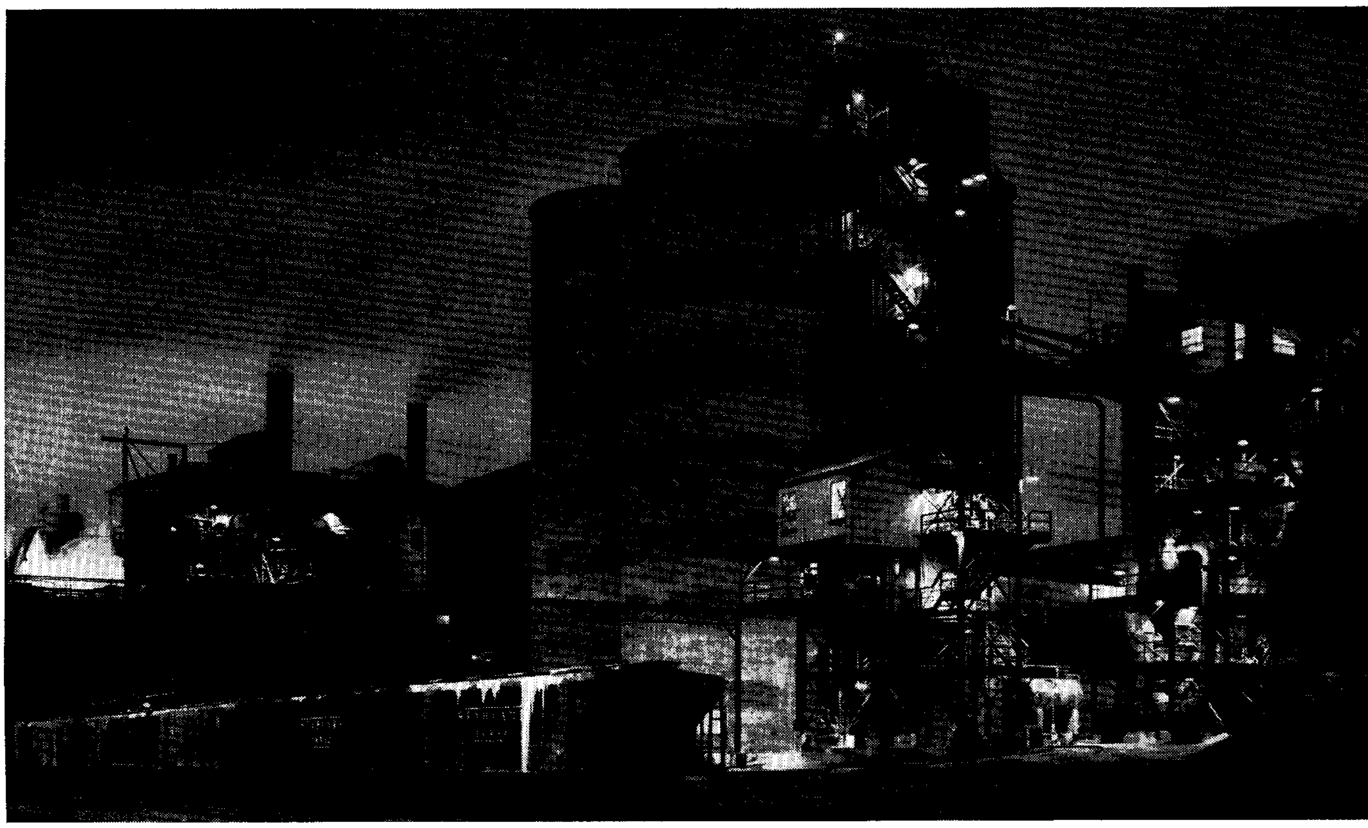
In addition the following information is shown; element name, atomic number, atomic weight, thermal neutron cross section value, nucleon number—A, relative natural isotopic abundance value, modes of disintegration and radiation type, isomeric states, fission products and atomic mass values. A graphic arrangement presents the nuclides in a grid system immediately identifying the isotopes, isobars and isotones. Invaluable as ready reference for teaching, or those working with or considering isotopes. *International copyright

H-10950—Chart of the Isotopes, 1953 edition, complete with guide book (postage prepaid) Each $ 5.00
Outside continental limits of U. S., rolled in mailing tube (air express prepaid) Each . . . . . $10.00

HARSHAW SCIENTIFIC

CINCINNATI • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES • PHILADELPHIA

# *In just one year...*
# over 1/4 million tons have switched



*Round-the-clock production at Bonnie takes the push out of peak-season demands. Mammoth off-season storage capacity swallows up the seven-day-a-week production, stores it safely until you need it. And the industry's finest delivery schedules assure you high-quality triple when you need it.*

## *International's natural curing helps you cut costs*

• It's the natural curing process that gives you that "something-extra" quality of the triple super from Bonnie.

It helps you cut costs . . . gives you better control of manufacturing conditions and chemical reactions . . . stabilizes your formulation problems . . . and reduces the delivered unit cost of ($P_2O_5$). Here's what natural curing means to you:

**Uniform particle size** . . . for dependable ammoniation results.

**Finer texture** . . . for more complete ammoniation in every batch.

**Stabilized product** . . . for better chemical control.

**Constant high analysis** . . . with guaranteed minimum of 46% A.P.A.

**Uniform high quality** . . . for increased ($P_2O_5$) availability.

To guarantee this top quality triple from a plant as large as Bonnie required extra planning in plant design . . . extra capacity for a dependable supply . . . extra time to complete the five-week natural curing process . . . and extra care and quality control to assure uniform results in batch after batch.

This is the way Bonnie was built. And the results of the past year have proved Bonnie can deliver . . . Bonnie is dependable . . . and Bonnie can produce the kind of triple you want.

# of Triple Super Sales to Bonnie

*The reason:* ***trustworthy service and delivery plus superior results with International's natural-cured triple***

Yes, in a single year, International has zoomed to a top position as a supplier in the triple super industry. Here's why, in the actual words of Bonnie customers:*

**Others have recommended you**

"Several nitrogen producers have recommended your product to us because of its excellent ammoniation. They were right."
*Missouri*

**You live up to delivery promises**

"What we like about doing business with International is your service, particularly regarding delivery. Our material has always been shipped when requested."
*Indiana*

**Your triple stores better**

"Last September, we stored some of your triple next to competitive materials from two other suppliers. Six months later, the other two piles were set up hard enough to be blasted. Any lumps in your product could be broken with your fingers."
*Minnesota*

**Your triple is a better product**

"This is the best triple we have ever used for ammoniation."
*Ontario*

**We get better ammoniation results**

"We can put 600 lbs. of Urana 10 in with 1,400 lbs. of triple."
*New York*

**Your Triple holds more nitrogen**

"We have been amazed with the results. With a very high humidity we have been using 500 lbs. of nitrogen solution with 1,400 lbs. of your triple. Never before have we been able to get over 360 lbs. of this solution in the mix."
*Maine*

**We save money with your triple**

"We like the constant high analysis of your product. It aids us in formulation and reduces the unit delivered cost."
*North Dakota*

**You meet delivery schedules**

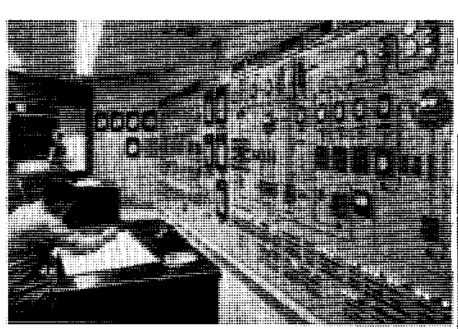
"We certainly appreciate the way International came through on schedule during the rush season."
*Arkansas*

**names on request*

These are just a few of the reasons why this year, the big switch in triple super sales is to Bonnie — giant production facilities . . . prompt delivery . . . superior quality . . . and outstanding ammoniation results.

So this year, for a better product, and service you can depend upon, look to International Minerals & Chemical Corporation. You'll be glad you did.

*This 85,000-ton curing unit — as big as two, full-sized football fields — is one example of the time and big capacity needed to produce natural-cured triple.*



*These "doodads" and dials get results . . . guard the uniformity and quality of every batch of triple super from Bonnie . . . help assure you of top results in ammoniation.*

**INTERNATIONAL MINERALS & CHEMICAL CORPORATION**

***Phosphate Chemicals Division • General Offices: 20 North Wacker Drive, Chicago 6***

# Hay Fever Control

## Does the answer lie in complete elimination of ragweed with chemicals or in shifting funds to research on immunization agents?

LATE SUMMER often means two things—heat and hay fever. The former is almost beyond man's control. The latter is not. But just how effective have ragweed control programs been? Can the plant actually be eliminated? Or is it best to stop all programs and divert available funds into research for immunization agents?

Answers to these questions vary with present day schools of thought:

- Ragweed can be eliminated by consistent mechanical attack and/or chemical application, says the Hay Fever Prevention Society.
- Man would be better off developing better immunization shots, says the American Foundation for Allergic Diseases.

The first school has covered the most ground; the latter has only been campaigning for two years.

### Total Elimination Impossible

Ragweed's total elimination from the United States is recognized as an all but impossible task—not that chemicals cannot do the job; its the manpower needed. Geographically speaking, ragweed seeds can show up anywhere, although they are most common east of the Rocky Mountains. But whether the seed ever matures depends on whether the soil is disturbed—and the seed can wait for 40 years.

However, ragweed is called a pioneer species—that is, it can't stand competition from other plants. This means, in barren soil areas, the prospects of ragweed growth are good; where grass and brush exists, probability is reduced.

But, is it feasible to have community programs dedicated to destruction of ragweed? Obviously, if the neighboring communities show little interest in ragweed removal, much of the benefits from mass eradication will be lost. But advocates of this approach point out that just as every public health program begins in a small way and spreads, so weed spraying programs will spread from city to city and state to state.

This year a number of towns in New Jersey, New York, Pennsylvania, and Connecticut will conduct programs of removal. Detroit, Cincinnati, and New York City are three major cities known to be preparing removal programs. Each year adds a few more to the list.

In addition, state highway departments are going in more and more for spraying with chemicals. One truck can do about 500 miles of right of way per day. And, application is needed only once a year. Mechanical means just can't compete on this basis. But th actual motivation behind the spraying programs is usually clouded. The angle may be either ragweed removal, possibly prompted by civic pressure, or just normal maintenance of highways. But, regardless of the reason, benefits are simultaneous—ragweed is removed, pollen counts reduced, and many miles of roadways are well kept.

### Chemical Removal Stressed

Most programs stress removal by chemical means; mechanical methods being all but forgotten. The strongest weapon against ragweed today is 2,4-D amine. It can be sprayed on by almost any convenient method—"flit guns," water cans, portable pumps, and "orchard spray" trucks. Very dilute solutions—from 0.1 to 0.05% by volume are adequate. The chemical has the advantage of not browning leaves and is somewhat selective in plants it will attack—ragweed being on the preferred lists. This does not, however, mean it can be sprayed carelessly.

Some use has been made of other materials—potassium cyanide and formulations that have either 2,4-D or its sister chemical 2,4,5-T as a component—but none appears to be particularly promising. As one expert sums it up, "2,4-D is dirt cheap."

However, the American Foundation for Allergic Diseases, holds the viewpoint that unless a ragweed campaign is national in scope or at least covering a wide section separated by a natural boundary, such as the Mississippi River, it would be of little real value. It is their hope that through research scientists may find out not only the answer to ragweed sensitivity, but to the innumerable sensitivities that plague allergic patients.

### Pollen Counts Stay High

The foundation points out that New York City's annual compaigns for ragweed eradication have met with failure. Pollen counts remain as high as ever, year after year.

From this and other data, the foundation people conclude the only real answer to ragweed control lies in research into the basic cause and effective treatment. Now, many of the 10 million persons suffering from hay fever, and other allergic disease can obtain preseasonal injections of pollen solution which is reasonably successful, although protection is not always complete.

But the big deterrent to research is lack of funds. Last year the foundation started a nationwide program to enlist $1.5 million from the public to carry on the work. Apparently the public is the only source of funds for any type of ragweed program. The Federal Government does not seem inclined to grant funds, and public opinion has not been crystallized enough to warrant attention by Congress.

Ragweed control is one of several aims in roadside spraying programs